Section 11 Test - Programming Techniques

1. Consider the following pseudocode:

```
var noOfTurns = input("Enter the number of turns: ")   <- A
if noOfTurns < 1 then                                  <- B
    print("Error - must be at least 1")
else
    for x=1 to noOfTurns                               <- C
        print(x)
        ...
    next x
endif
```

Here is a list of statement types that can be used in programming languages:

- Variable declaration
- Constant declaration
- Subroutine declaration
- Assignment
- Iteration
- Selection

Identify the statement that best suits parts A, B and C of the pseudocode above. [3]

A .....

B .....

C .....

2. a) Explain the difference between a constant and a variable. [1]

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b) Explain the difference between a global variable and a local variable. [2]

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c) Explain how parameters can be used to avoid the use of global variables. [2]

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d) A colleague has decided that when they are programming they are going to name all their variables in the order they are used, i.e. x1, x2, x3, x4... and so on. What is the problem with this and what would you recommend they do instead? [1]

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3. Programmers often use IDEs to improve their productivity.

a) What does IDE stand for? [1]

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b) IDEs often contain an auto-completion feature. Explain what an auto-completion feature is and how it can improve the productivity of a programmer. [2]

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c) A debugger can help a programmer debug their project.

i. Explain the role of a breakpoint in a debugger. [2]

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4. (a) Write pseudocode for a program which outputs the total of all the even numbers within a range entered by the user. [5]

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(b) State **two** ways of making programs easy to understand and maintain. [2]

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5. Read the pseudocode below and complete the trace table with the following data:

20, 25, 4, 1, 10

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temperature = 0
highest = 0
lowest = 50
total = 0
for index = 1 to 5
    temperature = input ("Enter temperature: ")
    if temperature > highest then
        highest = temperature
    endif
    if temperature < lowest then
        lowest = temperature
    endif
    total = total + temperature
next index
average = total/5
print ("Highest", highest)
print ("Lowest", lowest)
print ("Average", average)
```

Complete the trace table with the following data 20, 25, 4, 1, 10

temperature	highest	lowest	total	average	index	Output
0	**0**	**50**	**0**		**1**	

[6]

6. Write a subroutine called **answerYorN** to input and check the response to a question. It should be "y" or "n". Any other response is invalid, and the function should ask the user to re-enter until a valid response is received. The value is returned by the function to the main program.

The subroutine is called as follows:

response = answerYorN [5]

7. (a) Explain the difference between passing parameters **by value** and **by reference**. [4]

(b) (i) What is meant by modular programming? [2]

(ii) Give **four** advantages of modular programming. [4]

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(c) Explain why using local variables makes a large program easier to maintain. [2]

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8. (a) When using the debugging facilities of an IDE, explain what is meant by

(i) a watch [2]

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(ii) a trace [2]

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(b) State **two** other features of an IDE which are useful when entering or editing program code. [2]

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Total Marks = / 50